

Appendix B.9 to the NIBW Consent Decree

STATEMENT OF WORK FOR AREA 11 VADOSE ZONE WORK

INTRODUCTION

This Statement of Work (SOW) requires the Settling Defendants for Area 11 to implement the remedy for VOC vadose zone contamination in Area 11 at the North Indian Bend Wash (NIBW) Superfund site in accordance with the ROD. The purpose of this work is to attain Performance Standards for the VOCs in the vadose zone at Area 11. The initial steps of the remedy consist of installation and sampling of soil vapor monitoring wells and calculation of ground-water threat estimates. EPA will compare the ground-water threat estimates with the in-situ ground-water Performance Standards for VOCs. If EPA determines that soil vapor extraction (SVE) is necessary to attain Performance Standards, EPA will direct the Settling Defendants to implement the design, installation, operation and maintenance, and monitoring of a SVE system and periodic evaluation of the remaining threat to ground water posed by VOC vadose zone contamination in Area 11.

The work of the Settling Defendants shall be in accordance with:

- o this SOW,
- o Appendix K of the Public Comment Draft RI/FS report (EPA; April, 1991),
- o the ROD, and
- o the requirements of the Consent Decree.

The Settling Defendants shall furnish all personnel, materials, and services needed, or incidental to, performing the work described in this SOW, except as otherwise specified in the Consent Decree. EPA will oversee all work required by this SOW. EPA may require Settling Defendants to perform additional work to attain the vadose zone Performance Standards.

In order to fulfill the requirements of this Consent Decree, the Settling Defendants shall implement the following work:

1. AREA 11 FIELD SAMPLE PLAN, QUALITY ASSURANCE PROJECT PLAN, AND HEALTH AND SAFETY PLAN

Within fifteen (15) days of the effective date of the Consent Decree, the Settling Defendants shall prepare and submit for EPA approval, with a copy to the State, a Field Sample Plan (FSP), a Quality Assurance Project Plan (QAPP) and a Health and Safety Plan (HSP) for the field activities described in the SOW. The Settling Defendants shall not commence field work until EPA has approved the FSP and the QAPP. Each plan shall be submitted

by the Settling Defendants for review by EPA under a separate cover, with a copy to the State.

The Settling Defendants shall prepare the FSP and QAPP to ensure that soil vapor monitoring well installation, maintenance, sample collection, sample handling, and analytical activities are conducted in accordance with technically acceptable protocols, and to ensure that the data are useful for making estimates of the threat to ground water posed by the vadose zone contamination in Area 11. (The Draft Field Sampling Plan (EPA, 1988) for the NIBW site and the document "Soil Gas Survey of Vapor Monitoring Wells 3-213, 6-210, and 10-201, Scottsdale, Arizona" present a compendium of field sampling techniques, analytical methods, and associated quality assurance/quality control techniques that have been used at NIBW to date.)

The Settling Defendants shall prepare the HSP to provide guidance to individuals working on site with respect to Health and Safety.

If EPA requires installation of a SVE system in Area 11, the Settling Defendants shall include addenda to the FSP, QAPP and HSP as appendices to the SVE System Design in accordance with Task 6b of this SOW.

a. Area 11 Field Sample Plan (FSP)

The Settling Defendants shall prepare the FSP in accordance with the USEPA Region 9 guidance for Preparation of a Sampling and Analysis Plan for Private and State-Lead Superfund Projects (April, 1990). The Settling Defendants shall describe the approach to field activities in detail in the FSP, including the sampling and data gathering methods that will be used during implementation of the remedy. The Settling Defendants shall include in the FSP descriptions of sampling objectives, sampling locations and depths, sampling equipment and procedures, sample handling and analysis, decontamination, and disposal of remedy-derived wastes.

The Settling Defendants shall specify in the FSP the schedule for sampling and other monitoring activities to be conducted after soil vapor monitoring well installation.

Field logbooks used by the Settling Defendants shall record tubing materials and connections used, flow rates during sampling, vacuums during sampling, volume purged and rationale for that volume, and air temperature at time of sampling. The Settling Defendants shall provide for analysis of samples by gas chromatography using analytical methods that allow for a maximum detection limit of 0.01 ug/l. Soil gas samples shall be analyzed within an appropriate time period in accordance with the EPA-

approved FSP.

At a minimum, the Settling Defendants shall perform analysis of one system blank and three calibrations to known standards at the beginning of each sampling day and calibration to known standards between every 10 sample analyses. Duplicate sample analysis and split sample analysis shall also be incorporated by the Settling Defendants as QA/QC procedures.

In the FSP, the Settling Defendants shall define in detail the sampling and analysis methods and shall reference, as appropriate, relevant sections of the QAPP. The Settling Defendants also shall present the schedule for all field activities and reporting of sample analyses in the FSP.

b. Area 11 Quality Assurance Project Plan (QAPP)

The Settling Defendants shall prepare the QAPP in accordance with the USEPA Region 9 Guidance For Preparing Quality Assurance Project Plans For Superfund Remedial Projects (September, 1989). In the QAPP, the Settling Defendants shall describe the Data Quality Objectives (DQOs) and organization, functional activities, data reduction, validation, reporting and personnel qualifications for the work described in this SOW. The Settling Defendants may cite the Draft Field Sampling Plan (1988) to the extent the necessary techniques, protocols and QA/QC procedures are completely described therein.

The Settling Defendants shall demonstrate, to EPA's satisfaction, that each laboratory it uses is qualified to conduct the proposed work. This includes use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and DQOs approved by EPA in the QAPP for this SOW.

The Settling Defendants shall select a laboratory which has and follows an approved QA program. If the Settling Defendants select a laboratory which is not in EPA's Contract Laboratory Program (CLP), the selected laboratory shall use methods consistent with CLP methods that would be used at this site for the purposes proposed and QA/QC procedures approved by EPA. If the laboratory is not in the CLP program and is not currently approved by EPA for work at NIBW, prior to utilizing the analytical services of the laboratory, the Settling Defendants shall submit the laboratory's QA/QC program to EPA for approval. The Settling Defendants shall obtain EPA approval prior to initiation of work by the non-CLP laboratory. EPA will require that the Settling Defendants submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment, and material specifications. The Settling Defendants shall provide

assurances that EPA has access to laboratory personnel, equipment, and records for inspection of sample collection, transportation, and analysis activities.

c. Area 11 Health and Safety Plan (HSP)

The Settling Defendants shall prepare a Health and Safety Plan (HSP) that conforms with the Settling Defendants' Health and Safety program, and that complies with Occupational Safety & Health Act (OSHA) regulations and protocols. The HSP shall include elements such as: a health and safety risk summary, a description of monitoring and personal protective equipment, medical monitoring, site control, medical and emergency routes and contacts, etc. In particular, the Settling Defendants shall ensure compliance of field activities with 29 CFR Section 1910.120.

2. AREA 11 CONTRACT DOCUMENTS

Within sixty five (65) days of the effective date of the Consent Decree or within forty five (45) days of EPA's approval of the FSP and QAPP, whichever is later, the Settling Defendants shall submit for EPA approval, with a copy to the State, the executed contract documents for installation of soil vapor monitoring well(s). The contract documents shall indicate the scope and nature of the work being contracted for the installation of the soil vapor monitoring well(s).

3. AREA 11 SOIL VAPOR MONITORING WELL INSTALLATION AND SAMPLING

During this phase, the Settling Defendants shall implement relevant sections of the FSP, the QAPP and the HSP. The Settling Defendants shall collect and analyze data to provide the information required to accomplish the objectives of the ROD. The Settling Defendants shall notify EPA in writing, with a copy to the State, at least two weeks in advance of the field work regarding the planned dates for field activities, including selection of the well locations, drilling of the boreholes, soil sampling, soil analysis, installation of the wells, soil vapor sampling, soil vapor analysis, and any additional field activities to be conducted in support of the objective of the remedy. The Settling Defendants shall demonstrate to EPA's satisfaction that the laboratory analyses conducted meet the QA/QC procedures presented in the QAPP approved by EPA.

The Settling Defendants shall install two new soil vapor monitoring wells at the approximate locations shown in Figure 18 of the ROD. The Settling Defendants shall construct the two new soil vapor monitoring wells using the dual-wall reverse-circulation air percussion method (AP-1000 or equivalent non-rotating drill string rig) in a manner similar to existing well 3-213.

During advancement of the minimum 9-inch borehole for each soil vapor monitoring well, a geologist for the Settling Defendants shall prepare lithologic descriptions of materials derived from (at a maximum) 5-foot depth increments and also from formation changes. The lithologic descriptions shall include detailed observations of sample color, size distribution (Wentworth Scale), angularity-roundness, sorting, and minerals visible in the coarse fraction. At 10-foot (maximum) intervals, the Settling Defendants shall collect samples of the formation for analysis of soil physical properties and organic carbon content. If coarse gravel to boulder intervals prevent collection of samples over a particular 10-foot interval, unless the coarse gravel to boulder interval continues to the well completion depth, the Settling Defendants shall collect for analysis for soil properties and organic carbon content a sample from immediately beneath the coarse gravel to boulder interval. The soil physical properties and organic carbon content analyses shall be:

- 1) Particle Size Analysis by U.S.B.R. (1982) Land Classification Techniques and Standards, Series 510, Release 514.4.2 and 514.4.3, or EPA-approved equivalent.
- 2) Water content by ASTM Standard D2216-90, Standard Test Method for Laboratory Determination of Water Content of Soil, Rock and Soil-Aggregate Mixtures, or EPA-approved equivalent.
- 3) Soil Moisture Retention by American Society of Agronomy, Number 9, Part 1 (1986) Methods of Soil Analysis: Physical and Mineralogical Methods, Second Edition - Part 1 26-6.2, or EPA-approved equivalent.
- 4) Bulk Density Core Method by American Society of Agronomy, Number 9, Part 1 (1986) Methods of Soil Analysis: Physical and Mineralogical Methods, Second Edition - Part 1 13-2.2.1, or EPA-approved equivalent.
- 5) Total Organic Carbon by U.S. EPA (1981) Procedures for Handling and Chemical Analysis of Sediment and Water Samples. Contract No. EPA-4805572010, Method EPA 3-73, or EPA-approved equivalent. Pretreatment shall use at least 10% acid and oxidation shall be at a minimum of 500°C.

If coarse gravel to boulder intervals prevent collection of samples over particular 10-foot intervals, the Settling Defendants, when reporting the data to EPA, shall (1) describe in detail the presence and characteristics of the coarse gravel to boulder interval and (2) provide alternative estimates of soil properties for the intervals not sampled, with an accompanying detailed presentation of the basis for such estimates.

The Settling Defendants shall complete each borehole as a multiple-completion soil vapor monitoring well similar to 3-213. The Settling Defendants shall complete a minimum of four intervals with one-inch diameter, Schedule 80, 0.080" slotted PVC (or stainless steel) casing surrounded by a sand or gravel pack approved by EPA. Monitoring of consistent lithologic intervals between adjacent soil vapor monitoring wells shall be the primary consideration of the Settling Defendants for selecting exact completion depth intervals at each location.

Within the period between seven (7) and forty-five (45) days after installation of the new soil vapor monitoring wells, the Settling Defendants shall sample and analyze samples from the new soil vapor monitoring wells in accordance with the EPA-approved FSP and QAPP. The Settling Defendants also shall collect and analyze samples from the new soil vapor monitoring wells during the periods between twenty (20) and twenty-five (25) days and between forty (40) and forty-five (45) days after the initial sampling of the new soil vapor monitoring wells using approved procedures. The Settling Defendants shall notify EPA in writing, with a copy to the State, at least two weeks in advance of soil vapor monitoring activities.

The Settling Defendants shall consistently document and adequately record information gathered during the installation and sampling of soil vapor monitoring wells in well-maintained field logbooks and laboratory reports. The methods of documentation shall be specified by the Settling Defendants in the FSP. The Settling Defendants shall use field logbooks to document observations, measurements, and significant events that occur during installation and sampling of soil vapor monitoring wells. Shipping and laboratory reports shall be used by the Settling Defendants to document sample custody, identity of laboratory personnel who perform the required analyses, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and data deficiencies.

The Settling Defendants shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported to and used by EPA. Analytical results shall not be included by the Settling Defendants in the investigation and calculation report unless accompanied by or cross-referenced to a corresponding QA/QC documentation. In addition, the Settling Defendants shall establish a data security system to safeguard chain-of-custody forms and other project records from loss, damage, or alteration.

4. AREA 11 CALCULATION OF ESTIMATED GROUND-WATER THREAT

Using data from each of the sampling and VOC-analysis rounds of the new vapor monitoring well completions at Area 11, the Settling Defendants shall conduct calculations of ground-water

threat estimates for Area 11.

The Settling Defendants shall estimate the lateral and vertical extent of VOC contamination in soil vapor at concentrations greater than 10 ug/l.

The Settling Defendants shall use the soil property and soil vapor monitoring data from Area 11 to calculate equilibrium total vadose zone VOC concentrations which the Settling Defendants then shall combine with the volume of the affected vadose zone in Area 11 to calculate the estimated mass of VOCs in the vadose zone. VLEACH (or an EPA-approved equivalent) shall be used by the Settling Defendants to calculate the estimated mass flux of VOCs to ground water with time in Area 11. The Settling Defendants shall conduct VLEACH (or EPA-approved equivalent) calculations in a manner as described in Appendix K of the Public Comment Draft RI/FS report for Areas 7 and 8, or as otherwise approved by EPA. The Settling Defendants shall calculate mass flux estimates using VLEACH (or an EPA-approved equivalent) for all VOCs in Area 11 for which there are Performance Standards.

The Settling Defendants shall calculate the estimated incremental aqueous VOC concentrations with time through use of a mixing cell in a manner described in Appendix K of the Public Comment Draft RI/FS report for Areas 7 and 8, or as otherwise approved by EPA.

Parameters used in, and operation of, VLEACH (or an EPA-approved equivalent) and mixing cell calculations shall be subject to EPA approval.

If based upon the soil vapor monitoring data the Settling Defendants conclude that the mass in the vadose zone in Area 11 of any VOC for which there are Performance Standards represents too small a threat to groundwater to warrant calculating the estimated mass flux and the estimated incremental aqueous concentration for that VOC, the Settling Defendants may, upon written approval by EPA, forgo such calculations. EPA's decision whether to approve forgoing the calculations shall not be subject to Dispute Resolution.

5. AREA 11 VADOSE ZONE INVESTIGATION AND GROUND-WATER THREAT CALCULATIONS REPORT

Within three hundred thirty-five (335) days of the effective date of the Consent Decree or within three hundred fifteen (315) days of EPA's approval of the FSP and QAPP, whichever is later, the Settling Defendants shall submit for EPA approval, with a copy to the State, an "Area 11 Vadose Zone Investigation and Ground-Water Threat Calculations Report". The Settling Defendants shall include the following items in the Area 11 Vadose Zone Investigation and Ground-Water Threat Calculations

Report:

- 1) A summary of field investigations conducted through Task 4 (Area 11 Calculation of Estimated Ground-Water Threat) of this SOW;
- 2) A presentation of all data collected during the field investigation;
- 3) A presentation of mass estimates and supporting data and assumptions;
- 4) A presentation of mass flux estimates (VLEACH or EPA-approved equivalent calculations) and supporting inputs to the model, assumptions, and model output; and
- 5) A presentation of incremental VOC ground-water concentration estimates (mixing cell calculations) and supporting inputs to the model, assumptions, and model output.

The Settling Defendants shall submit as appendices to the Area 11 Vadose Zone Investigation and Ground-Water Threat Calculations Report all validated data, lithologic descriptions, well construction diagrams, chain-of-custody forms, and any other information used to document the findings.

Based upon the Area 11 Vadose Zone Investigation and Ground-Water Threat Calculations Report and any other information deemed appropriate by EPA, EPA shall issue to the Settling Defendants a "Letter of Determination" regarding attainment of Performance Standards at Area 11. EPA's Letter of Determination will state a finding that (1) the Settling Defendants are not required to implement SVE at Area 11 because Performance Standards have been attained, (2) the Settling Defendants are required to implement SVE in Area 11 in order to attain Performance Standards, or (3) the Settling Defendants are required to perform additional work in Area 11 to determine if Performance Standards have been attained. EPA's Letter of Determination will reference the information used as a basis for EPA's finding.

If EPA's Letter of Determination indicates that Performance Standards have been attained in Area 11, the Settling Defendants shall proceed to Task 11 (Equipment Disassembly and Abandonment) of this SOW. If EPA's Letter of Determination indicates the Settling Defendants are required to implement SVE in Area 11, the Settling Defendants shall proceed with Task 6 (SVE System Design) of this SOW. If EPA's Letter of Determination indicates additional work is required to determine if Performance Standards have been attained in Area 11, the Settling Defendants shall submit to EPA, with a copy to the State, within thirty (30) days of receipt of EPA's Letter of Determination, a written proposal

for additional work, including a proposed schedule for its implementation. Upon written approval by EPA, the Settling Defendants shall implement the proposal for additional work in Area 11. After the Settling Defendants have completed the additional work, including submission of a revised Area 11 Vadose Zone Investigation and Ground-Water Threat Calculations Report to EPA, EPA will issue a new Letter of Determination for Area 11.

6. AREA 11 SVE SYSTEM DESIGN

SVE design for Area 11 shall include the following tasks:

- a. Preparation and submittal of an "SVE Design Analysis Report" that describes data and assumptions to be used in the SVE system design, and
- b. Design of the SVE system ("SVE System Design").

a. Area 11 SVE Design Analysis Report

Within thirty (30) days of receipt of an EPA Letter of Determination that requires SVE implementation, the Settling Defendants shall prepare and submit for EPA approval, with a copy to the State, an Area 11 SVE Design Analysis Report. The Settling Defendants shall include in the Area 11 SVE Design Analysis Report a presentation of any data collected in addition to those provided in the Area 11 Vadose Zone Investigations and Ground-Water Threat Estimate Calculations Report, and a presentation of assumptions and calculation methods to be used in the SVE System Design. The Settling Defendants shall include as appendices to the SVE Design Analysis Report all validated data, field logs, well construction logs, chain-of-custody forms and any other information not previously submitted to EPA that are used to support the proposed design assumptions. The Settling Defendants shall include in the Area 11 SVE Design Analysis Report proposals for additional soil vapor monitoring wells.

b. Area 11 SVE System Design

Within sixty (60) days of EPA's written approval of the Area 11 Design Analysis Report, the Settling Defendants shall prepare and submit for EPA approval, with a copy to the State, a SVE System Design for Area 11. In the SVE System Design, the Settling Defendants shall describe the objectives of the SVE system, essential components of the SVE system, a plan for operations and maintenance of the SVE system, a monitoring program and a plan for modifying the SVE system to achieve timely attainment of Performance Standards. The Settling Defendants also shall provide in the SVE System Design a discussion of how the design will comply with the substantive requirements of state and local regulations. The SVE System Design shall include a proposed schedule for implementation of the SVE system.

With the Area 11 SVE System Design, the Settling Defendants shall submit to EPA, with a copy to the State, any addenda necessary to allow appropriate and protective application of the FSP, QAPP, and/or HSP developed for implementation of the Area 11 vadose zone remedy.

7. AREA 11 SVE SYSTEM INSTALLATION AND OPERATION

Upon written EPA approval of the SVE System Design, the Settling Defendants shall implement relevant sections of the FSP, the QAPP, the HSP and the SVE System Design in accordance with the schedule approved by EPA. The Settling Defendants shall notify EPA in writing, with a copy to the State, upon completion of SVE system installation support activities. The Settling Defendants also shall notify EPA in writing, with a copy to the State, at least two weeks in advance of the commencement of SVE system installation regarding the planned dates for field activities, including selection of the component locations, trenching, drilling of the boreholes, installation of the system components, and any additional field activities to be conducted in support of the installation. The Settling Defendants shall demonstrate to EPA's satisfaction that the type and location of the selected components are in accordance with the design.

The Settling Defendants shall consistently document and adequately record information gathered during the SVE system installation in well-maintained field logbooks and reports. The Settling Defendants shall specify the methods of documentation in the SVE System Design. The Settling Defendants shall use field logbooks to document observations, measurements, and significant events that occur during SVE system installation activities.

In accordance with the schedule approved as part of the SVE System Design, the Settling Defendants shall prepare and submit to EPA, with a copy to the State, a "SVE System Installation Report" that describes the as-built system, data collected during installation, and any differences from the EPA-approved design, including a demonstration that the differences shall not have a significant impact on the Settling Defendants' ability to attain Performance Standards in an effective and timely manner.

The Settling Defendants shall maintain field reports, shipment records, and other reports to ensure that only valid data are reported to and used by EPA. As-built descriptions developed based on SVE system installation shall not be included by the Settling Defendants in the SVE System Installation Report unless accompanied by or cross-referenced to a corresponding supporting report. In addition, the Settling Defendants shall establish a data security system to safeguard field logbooks and other project records from loss, damage, or alteration.

The Settling Defendants shall begin operation of the SVE

system after receiving written EPA approval of the SVE System Installation Report and after collecting data from the monitoring system which provides pre-operation conditions. The Settling Defendants shall provide the rationale for and elements of the monitoring system in a monitoring program in the SVE System Design.

The Settling Defendants shall describe the operation of the SVE system in an operations and maintenance plan in the SVE System Design. The Settling Defendants shall operate the SVE system in a diligent manner so as to attain vadose zone Performance Standards in the most timely manner.

EPA may require installation and operation of additional SVE wells, either to concentrate or expand VOC mass-removal with area or depth to attain Performance Standards in a timely fashion. The Settling Defendants may request, in writing, EPA's approval to modify the SVE system and/or operation in accordance with the approach for modification provided in the SVE System Design. Requests for modification of system operation shall be supported by the Settling Defendants with data summaries and calculations.

8. AREA 11 SVE MONITORING

The monitoring by the Settling Defendants shall include the gathering of data to estimate the VOC-mass removal rate and effectiveness of the remedy as well as the nature and extent of vadose zone contamination by VOCs in Area 11. These activities shall be performed by the Settling Defendants in accordance with the FSP and the QAPP.

The Settling Defendants shall monitor the operation of the SVE system as described in the monitoring plan in the SVE System Design. At a minimum, the Settling Defendants' monitoring initially shall consist of:

- 1) Measuring air flow rates and pressures at each SVE well. For the three (3) days immediately prior to start-up, the Settling Defendants shall monitor pressure in the SVE well on an hourly basis. Beginning with start-up, the Settling Defendants shall monitor air flow rates and pressures at each SVE well on at least an hourly basis. The Settling Defendants' monitoring shall maintain an accuracy of plus/minus 10 standard cubic feet per minute for flow rate and plus/minus 0.1 atmospheres for pressure.
- 2) Measuring air pressures at each completion interval of each soil vapor monitoring well. For the three (3) days immediately prior to start-up, the Settling Defendants shall monitor pressures in each completion interval on a daily basis. Beginning with start-up,

the Settling Defendants shall monitor air pressures at each completion interval of each soil vapor monitoring well on at least a weekly basis. The Settling Defendants' monitoring shall maintain an accuracy of plus/minus 0.1 atmospheres for pressure.

- 3) During SVE system operation, sampling and VOC analysis of soil vapor in each SVE well and at the exhaust end of the carbon treatment system on at least a weekly basis. The analytical method used by the Settling Defendants shall allow for a maximum detection limit of 0.01 ug/l of soil gas.
- 4) During SVE system operation, sampling and VOC analysis of soil vapor in each completion interval of each soil vapor monitoring well on at least a semi-annual basis. The analytical method used by the Settling Defendants shall allow for a maximum detection limit of 0.01 ug/l of soil gas. The Settling Defendants shall sample and analyze soil vapor for VOCs in all completion intervals of all soil vapor monitoring wells within one week of start-up and by the end of every sixth month thereafter.

The Settling Defendants shall notify EPA in writing, with a copy to the State, at least two weeks in advance of the soil vapor monitoring in soil vapor monitoring wells and any additional field sampling activities to be conducted in support of the objectives of the remedy. At any time, the Settling Defendants may submit to EPA, with a copy to the State, a proposal, including a detailed justification, for a change in the frequency of soil vapor monitoring at any location. The Settling Defendants shall demonstrate that the laboratory analyses conducted for the monitoring of the remedy meet the QA/QC procedures presented in the QAPP approved by EPA.

The Settling Defendants shall consistently document and adequately record field information in well-maintained field logbooks and laboratory reports. The methods of documentation shall be specified by the Settling Defendants in the monitoring program in the SVE System Design. The Settling Defendants shall use field logbooks to document observations, measurements, and significant events that occur during monitoring activities. Shipping and laboratory reports shall be used by the Settling Defendants to document sample custody, identity of laboratory personnel who perform the required analyses, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and data deficiencies.

The Settling Defendants shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported to and used by

EPA. Analytical results developed under this SOW shall not be included by the Settling Defendants in any reports to EPA unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Settling Defendants shall establish a data security system to safeguard chain-of-custody forms and other project records from loss, damage, or alteration.

9. AREA 11 CALCULATION OF ESTIMATED REMAINING GROUND-WATER THREAT

Using data from each complete sampling and VOC-analysis round of all soil vapor monitoring well completions, the Settling Defendants shall calculate ground-water threat estimates for Area 11 as described in Task 4 (Area 11 Calculation of Estimated Ground-Water Threat) of this SOW. After the Settling Defendants have started to operate the SVE system, the Settling Defendants shall calculate ground-water threat estimates for Area 11 at least semi-annually (every six months).

10. AREA 11 SEMI-ANNUAL REMEDY EVALUATION REPORTS

By the end of the ninth month of the operation of the SVE system and by the end of every sixth month thereafter, the Settling Defendants shall submit for EPA approval, with a copy to the State, an Area 11 "Semi-Annual SVE Evaluation Report" that summarizes the data collected from the monitoring program and evaluates the effectiveness of the SVE system with respect to VOC mass removal and compliance with the Performance Standards. The Settling Defendants shall include in each Area 11 Semi-Annual SVE Evaluation Report complete documentation of all ground-water threat estimates calculated since the previous Area 11 Semi-Annual SVE Evaluation Report.

When the Settling Defendants conclude that vadose zone Performance Standards have been attained for Area 11, the Settling Defendants may include in the Area 11 Semi-Annual SVE Evaluation Report a request to discontinue operation of the SVE system. Any such request to discontinue operation of the SVE system shall include a detailed proposal for long-term monitoring for potential rebound of VOC concentrations in soil vapor. Upon written approval by EPA, the Settling Defendants may discontinue operation of the SVE system, at which time the Settling Defendants shall implement the EPA-approved long-term monitoring. Based upon subsequent Area 11 Semi-Annual SVE Evaluation Reports submitted by the Settling Defendants, EPA will (1) direct the Settling Defendants to continue monitoring for rebound, (2) direct the Settling Defendants to resume SVE system operation, or (3) issue a Letter of Determination stating that vadose zone Performance Standards have been attained for Area 11. When the Settling Defendants have received from EPA a Letter of Determination stating that vadose zone Performance Standards have been attained for Area 11, the Settling Defendants shall have no further obligations under this SOW, except as provided under Task

11 (Equipment Disassembly and Abandonment).

The Settling Defendants may submit a request to discontinue operation of the SVE system at times other than with the submission of the Area 11 Semi-Annual SVE Evaluation Reports. Provided, however, that (1) all requests to discontinue operation of the SVE system shall be accompanied by detailed supporting analysis and (2) the Settling Defendants shall not submit a request to discontinue operation of the SVE system prior to ninety (90) days after the previous such request.

11. EQUIPMENT DISASSEMBLY AND ABANDONMENT

Within thirty (30) days of receipt of an EPA Letter of Determination indicating that Performance Standards have been attained for Area 11, the Settling Defendants shall submit for EPA approval, with a copy to the State, a proposal for proper disassembly, removal and/or abandonment of all on-site equipment installed by the Settling Defendants to implement the Area 11 vadose zone remedy. The Settling Defendants shall include in such proposal a proposed schedule for implementation. Upon written approval by EPA, the Settling Defendants shall implement the proposal. Documentation of equipment disassembly, removal and abandonment activities, including diagrams depicting in detail the remaining conditions of any equipment left on-site, shall be included in the written report required for Area 11 under Section XV of the Consent Decree (Certification of Completion).